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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,893	09/19/2003	Shoji Kodama	16869B-028110US	7009

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EXAMINER	
NAMAZI, MEHDI	

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 09/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/665,893	KODAMA, SHOJI	
	Examiner	Art Unit	
	Mehdi Namazi	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09/19/03* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/19/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to application filed September 19, 2003.

Specification

2. *The specification lacks necessary reference to the prior application. A statement reading "this is a of application No.xxxxxxx, filed xxxxxx, now U.S. Patent xxxxxx." Should be entered following the title of the invention or as the first sentence of the specification.*

Double Patenting

3. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-20 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-20 of prior U.S. Patent No. 6,647,460 B2. This is a double patenting rejection.

Claims 1-20 of the patent is compared to claims 1-20 of instant application in the table below.

Instant Application	***Patent***
1. A method of reallocating data among	*1. A method of reallocating data among*

physical disks corresponding to a logical disk, the method comprising: partitioning a logical disk into a plurality of groups, each group comprising at least one segment on at least one of a first plurality of physical disks corresponding to the logical disk; partitioning one group of the plurality of groups into a plurality of sub-groups; and for each sub-group of the plurality of sub-groups but one, copying the sub-group to at least one segment on at least one of a second plurality of physical disks corresponding to the logical disk.	*physical disks corresponding to a logical disk, the method comprising: partitioning a logical disk into a plurality of groups, each group comprising at least one segment on at least one of a first plurality of physical disks corresponding to the logical disk; partitioning one group of the plurality of groups into a plurality of sub-groups; and for each sub-group of the plurality of sub-groups but one, copying the sub-group to at least one segment on at least one of a second plurality of physical disks corresponding to the logical disk.*
2. The method of claim 1, further comprising: determining a highly accessed group of the plurality of groups; and wherein partitioning one group includes partitioning the highly accessed group.	*2. The method of claim 1, further comprising: determining a highly accessed group of the plurality of groups; and wherein partitioning one group includes partitioning the highly accessed group.*
3. The method of claim 1, further comprising repeating the partitioning one group step and repeating the for each sub-group, copying the sub-group step for	*3. The method of claim 1, further comprising repeating the partitioning one group step and repeating the for each sub-group, copying the sub-group step for*

another group of the plurality of groups.	*another group of the plurality of groups.*
4. The method of claim 1, further comprising indicating the one sub-group of the plurality of sub-groups as a new group in the plurality of groups.	*4. The method of claim 1, further comprising indicating the one sub-group of the plurality of sub-groups as a new group in the plurality of groups.*
5. The method of claim 4, further comprising indicating each sub-group of the plurality of sub-groups but the one as a new group in the plurality of groups.	*5. The method of claim 4, further comprising indicating each sub-group of the plurality of sub-groups but the one as a new group in the plurality of groups.*
6. The method of claim 1 further comprising, for the one sub-group of the plurality of subgroups, copying the sub-group to at least one segment on at least one of the second plurality of physical disks.	*6. The method of claim 1 further comprising, for the one sub-group of the plurality of subgroups, copying the sub-group to at least one segment on at least one of the second plurality of physical disks.*
7. The method of claim 1 further comprising: receiving a request to read data from one of the sub-groups of the plurality of sub-groups but the one; determining whether the requested sub-group is currently being copied; if not currently being copied, reading the data	*7. The method of claim 1 further comprising: receiving a request to read data from one of the sub-groups of the plurality of sub-groups but the one; determining whether the requested sub-group is currently being copied; if not currently being copied, reading the data*

from the sub-group on the at least one of the second plurality of physical disks; if currently being copied, reading the data from the group corresponding to the sub-group on the at least one of the first plurality of physical disks.	*from the sub-group on the at least one of the second plurality of physical disks; if currently being copied, reading the data from the group corresponding to the sub-group on the at least one of the first plurality of physical disks.*
8. The method of claim 1 further comprising: receiving a request to write data to one of the sub-groups of the plurality of sub-groups but the one; determining whether the requested sub-group is currently being copied by checking a status of the one of the sub-groups; if currently being copied, changing the status of the one of the sub-groups to indicate that copying of the one of the sub-groups is completed; and writing the data to the one of the sub-groups.	*8. The method of claim 1 further comprising: receiving a request to write data to one of the sub-groups of the plurality of sub-groups but the one; determining whether the requested sub-group is currently being copied by checking a status of the one of the sub-groups; if currently being copied, changing the status of the one of the sub-groups to indicate that copying of the one of the sub-groups is completed; and writing the data to the one of the sub-groups.*
9. The method of claim 8 further comprising, if currently being copied, writing the data to the group corresponding to the one of the sub-groups on the at	*9. The method of claim 8 further comprising, if currently being copied, writing the data to the group corresponding to the one of the sub-groups on the at*

least one of the first plurality of physical disks.	*least one of the first plurality of physical disks.*
10. A storage device comprising: a first plurality of physical disks corresponding to a logical disk, wherein the logical disk is partitioned into a plurality of groups, each group comprising at least one segment on at least one of the first plurality of physical disks; at least a second physical disk corresponding to the logical disk; a processor, coupled with the first plurality of physical disks and with the at least a second physical disk, the processor configured to: partition one group of the plurality of groups into a plurality of sub-groups; and for each sub-group of the plurality of sub-groups but one, copy the sub-group to at least one segment on the at least a second physical disk; and a disk controller, coupled with a first memory, with the first plurality of physical disks and with the at least a second physical disk,	*10. A storage device comprising: a first plurality of physical disks corresponding to a logical disk, wherein the logical disk is partitioned into a plurality of groups, each group comprising at least one segment on at least one of the first plurality of physical disks; at least a second physical disk corresponding to the logical disk; a processor, coupled with the first plurality of physical disks and with the at least a second physical disk, the processor configured to: partition one group of the plurality of groups into a plurality of sub-groups; and for each sub-group of the plurality of sub-groups but one, copy the sub-group to at least one segment on the at least a second physical disk; and a disk controller, coupled with a first memory, with the first plurality of physical disks and with the at least a second physical disk,*

and coupled to receive I/0 requests for the logical disk from at least one host computer, the disk controller configured to: determine one or more of the physical disks of the first plurality of physical disks and the at least a second physical disk to which an I/O request corresponds; and perform the requested I/O to the determined one or more of the physical disks.	*and coupled to receive I/0 requests for the logical disk from at least one host computer, the disk controller configured to: determine one or more of the physical disks of the first plurality of physical disks and the at least a second physical disk to which an I/O request corresponds; and perform the requested I/O to the determined one or more of the physical disks.*
11. The storage device of claim 10, wherein the processor is further configured to: determine whether an I/O request to read data corresponds to data within a sub-group being copied to the at least a second physical disk; if not currently being copied, read the data from the sub-group on the at least a second physical disk; if currently being copied, read the data from the group corresponding to the sub-group on the first plurality of disks.	*11. The storage device of claim 10, wherein the processor is further configured to: determine whether an I/O request to read data corresponds to data within a sub-group being copied to the at least a second physical disk; if not currently being copied, read the data from the sub-group on the at least a second physical disk; if currently being copied, read the data from the group corresponding to the sub-group on the first plurality of disks.*
12. The storage device of claim 10,	*12. The storage device of claim 10,*

wherein the processor is further configured to: determine whether an I/O request to write data corresponds to data within a sub-group being copied to the at least a second physical disk; if currently being copied, change a status of the sub-group to indicate that copying of the sub-group is completed; and write the data to the sub-group on the at least a second physical disk.	*wherein the processor is further configured to: determine whether an I/O request to write data corresponds to data within a sub-group being copied to the at least a second physical disk; if currently being copied, change a status of the sub-group to indicate that copying of the sub-group is completed; and write the data to the sub-group on the at least a second physical disk.*
13. The storage device of claim 12, wherein the processor is further configured to write the data to the group corresponding to the sub-group on the first plurality of physical disks.	*13. The storage device of claim 12, wherein the processor is further configured to write the data to the group corresponding to the sub-group on the first plurality of physical disks.*
14. A method of reallocating data among physical disks corresponding to a logical disk, the method comprising: partitioning a logical disk into a plurality of groups, wherein each group comprises a plurality of segments on at least one of a first plurality of physical disks corresponding to	*14. A method of reallocating data among physical disks corresponding to a logical disk, the method comprising: partitioning a logical disk into a plurality of groups, wherein each group comprises a plurality of segments on at least one of a first plurality of physical disks corresponding to*

the logical disk; determining a most frequently accessed group of the plurality of groups; partitioning the most frequently accessed group into a plurality of sub-groups, including partitioning each segment of the plurality of segments comprising the most frequently accessed group into a plurality of sub-segments, wherein each sub-group comprises at least one sub-segment; for each sub-group of the plurality of sub-groups but one, allocating at least one segment on at least one of a second plurality of physical disks corresponding to the logical disk, each segment on the second plurality of disks corresponding to the at least one sub-segment comprising the sub-group; and for each sub-group of the plurality of sub-groups but the one, copying the corresponding at least one sub-segment to the corresponding at least one segment on the at least one of the second plurality of	*the logical disk; determining a most frequently accessed group of the plurality of groups; partitioning the most frequently accessed group into a plurality of sub-groups, including partitioning each segment of the plurality of segments comprising the most frequently accessed group into a plurality of sub-segments, wherein each sub-group comprises at least one sub-segment; for each sub-group of the plurality of sub-groups but one, allocating at least one segment on at least one of a second plurality of physical disks corresponding to the logical disk, each segment on the second plurality of disks corresponding to the at least one sub-segment comprising the sub-group; and for each sub-group of the plurality of sub-groups but the one, copying the corresponding at least one sub-segment to the corresponding at least one segment on the at least one of the second plurality of*

physical disks.	*physical disks.*
15. The method of claim 14 further comprising, for the one sub-group of the plurality of sub-groups: allocating at least one segment on at least one of the second plurality of physical disk, each segment on the second plurality of disks corresponding to the at least one sub-segment comprising the one sub-group; and copying the corresponding at least one sub-segment to the corresponding at least one segment on the at least one of the second plurality of physical disks.	*15. The method of claim 14 further comprising, for the one sub-group of the plurality of sub-groups: allocating at least one segment on at least one of the second plurality of physical disk, each segment on the second plurality of disks corresponding to the at least one sub-segment comprising the one sub-group; and copying the corresponding at least one sub-segment to the corresponding at least one segment on the at least one of the second plurality of physical disks.*
16. A storage device comprising: a first plurality of physical disks corresponding to a logical disk, wherein the logical disk is partitioned into a plurality of groups, each group comprising at least one segment on at least one of the first plurality of physical disks; at least a second physical disk corresponding to the logical disk; a	*16. A storage device comprising: a first plurality of physical disks corresponding to a logical disk, wherein the logical disk is partitioned into a plurality of groups, each group comprising at least one segment on at least one of the first plurality of physical disks; at least a second physical disk corresponding to the logical disk; a*

processor, coupled with the first plurality of physical disks and with the at least a second physical disk, the processor configured to: partition one group of the plurality of groups into a plurality of sub-groups; and for each sub-group of the plurality of sub-groups but one, copy the sub-group to at least one segment on the at least a second physical disk.	*processor, coupled with the first plurality of physical disks and with the at least a second physical disk, the processor configured to: partition one group of the plurality of groups into a plurality of sub-groups; and for each sub-group of the plurality of sub-groups but one, copy the sub-group to at least one segment on the at least a second physical disk.*
17. The storage system of claim 16, wherein the processor is further configured to determining a highly accessed group of the plurality of groups, and wherein partitioning one group includes partitioning the highly accessed group.	*17. The storage system of claim 16, wherein the processor is further configured to determining a highly accessed group of the plurality of groups, and wherein partitioning one group includes partitioning the highly accessed group.*
18. The storage system of claim 16, wherein the processor is further configured to repeat the partitioning one group step and to repeat the for each sub-group, copying the sub-group step for another group of the plurality of groups.	*18. The storage system of claim 16, wherein the processor is further configured to repeat the partitioning one group step and to repeat the for each sub-group, copying the sub-group step for another group of the plurality of groups.*
19. The storage system of claim 16,	*19. The storage system of claim 16,*

wherein the processor is further configured to, for the one sub-group of the plurality of subgroups, copy the sub-group to at least one segment on at least one of the second plurality of physical disks.	*wherein the processor is further configured to, for the one sub-group of the plurality of subgroups, copy the sub-group to at least one segment on at least one of the second plurality of physical disks.*
20. The storage system of claim 16, wherein the processor is coupled to receive I/O requests for the logical disk from at least one host computer, and wherein the processor is further configured to: determine one or more of the physical disks of the first plurality of physical disks and the at least a second physical disk to which an I/O request corresponds; and perform the requested I/O to the determined one or more of the physical disks.	*20. The storage system of claim 16, wherein the processor is coupled to receive I/O requests for the logical disk from at least one host computer, and wherein the processor is further configured to: determine one or more of the physical disks of the first plurality of physical disks and the at least a second physical disk to which an I/O request corresponds; and perform the requested I/O to the determined one or more of the physical disks.*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehdi Namazi whose telephone number is 703-306-2758. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 703-306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mehdi Namazi
Patent Examiner

September 1, 2004